



## Dèjà Vu All Over Again: Serial Correlation and Micro-Cap Equities

Experienced investors understand how compounded returns can have a significant effect on wealth creation. However it takes more than a little resolve to reap the full rewards of compounded returns, as equities have declined approximately 50% not once but twice in the past fifteen years. Despite these periods of steep decline, equities – particularly micro-cap equities – have provided patient investors with large rewards over the long term. Understanding historical trends in market returns might help investors gain the perspective needed to make investing for the long term an easier pill to swallow.

### SINCE 1926, EQUITIES HAVE BEEN POSITIVE 73% OF THE TIME

	Large-Cap Equities (S&P 500)	Micro-Cap Equities (9-10 decile)
Average Annualized	12.0%	18.2%
# of Positive	67 years	63 years
# of Negative	24 years	28 years

Source: Ibbotson SBBI/Perritt Cap 2016.

Historical performance trends show that positive and negative returns tend to be grouped together. To understand if there are trends within stock performance, we turn to a statistic terms called serial correlation. The serial correlation of a return series describes the extent to which the return in one period is related to the return in the next period. A return series with a high (near one) serial correlation is very predictable from one period to the next, while one with a low (near zero) serial correlation is random and unpredictable. In the table below, we provide serial correlation for equities, bond defaults, inflation rates and real interest rates. The results show that large equities returns do not show predictive results, ie. their performance is purely random. However, while micro-cap equities returns are of course not purely predictive, there is a likely trend of serial correlation that has been observed within their historical performance.

### LIKELY TRENDS OCCUR IN MICRO-CAP EQUITY RETURNS

Equity Risk Premia	0.03	Random
Small Equity Risk Premia	0.36	Likely Trend
Bond Default Premia	-0.31	Likely Trend
Inflation Rates	0.64	Trend
Real Interest Rates	0.91	Trend

Source: Ibbotson SBBI, 2015.

We gathered 91 years of performance in micro-cap equities and grouped them into single-year and consecutive-years performance periods in the table below. (see methodology below\*). **We found that there were three times as many periods where micro-cap equities experienced a winning streak than period where positive returns lasted only one year.**



## ONLY FIVE INSTANCES OF MULTIPLE YEARS OF NEGATIVE PERFORMANCE SINCE 1926

### Micro-Cap Equities

	Positive Return Periods	Negative Return Periods
Consecutive Years	17	5
Single Year	5	15

Source: Ibbotson SBBi, 2015.

Overall the 42 periods analyzed, negative returns do not occur in back to back years often, while positive returns do often occur in consecutive years. There were only 5 consecutive-year periods where performance was negative (four periods lasted two years and one period lasted four years). There were 17 periods in which micro-cap equities rose for two or more years in a row. Of the 17 consecutive-year periods of positive returns, 7 lasted two years, 4 lasted three years and 6 lasted four years or more.

## HOW SERIAL CORRELATION IN MICRO-CAP EQUITIES IMPACTS INVESTORS

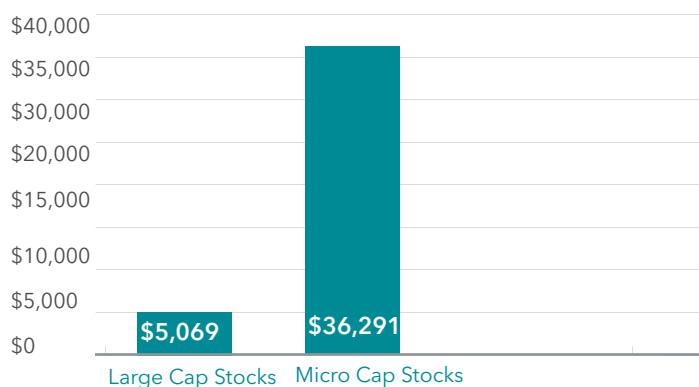
	Total Return	Average Annualized
1933-1936	597.0%	62.5%
1949-1952	84.5%	16.6%
1975-1983	1,421.0%	35.3%
1991-1997	332.1%	23.3%
2003-2006	133.7%	23.6%

Source: Ibbotson SBBi/Perritt Cap 2016.

The annualized and total return performance of the six periods which lasted four or more years are listed above. This type of serial correlation to the upside demonstrates why many patient investors have earned significant rewards, notably in the micro-cap equities.

## MICRO-CAP EQUITIES HAVE PROVIDED STRONG LONG-TERM RETURNS

### \$1 Invested Jan. 1, 1926,- Dec. 31, 2016



Source: Ibbotson SBBi/Perritt Cap 2016.

\*For example, micro-cap equities had a negative return in 1937, positive returns in 1938 and 1939, negative returns in 1940 and 1941 and then a string of positive returns from 1942 to 1945. This example includes four distinct performance periods: one single-year period of negative returns (1937), two consecutive-year periods of positive returns (1938-39, 1942-45) and one consecutive-year period of negative return (1940-41).

The information provided herein represents the opinion of Perritt Capital Management and is not intended to be a forecast of future events, a guarantee of future results, nor investment advice.

*Micro-cap equities are defined as the 9th and 10th decile of all companies listed on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ, as ranked by market capitalization, ending 12/31/2016, according to Ibbotson & Associates Classic Yearbook and Perritt Capital Management, 2016 IQ. Equities are defined as all ten deciles of stocks listed on the above exchanges. Long term Corporate Bonds returns are measured using the Salomon Brothers Index, which is a common American Bond index, akin to the S&P 500 for stocks, originally owned by Salomon Brothers and now run by its successor, Citigroup. Long Term Government Bond returns are measured from data constructed from the Wall Street Journal and the Government Bond Fil at the Center for Research in Security Prices (CRSP). Large-cap equities are defined as the S&P 500 Index. The Consumer Price Index is used to measure inflation. Real interest rates are interest rates that have been adjusted to remove the effects of inflation. Equity Premia is defined as the excess return that a group of stocks or the overall stock market provides over a risk-free rate. Bond Premia is defined as the net return from investing in long-term corporate bonds rather than long term government bonds. Serial Correlation can be applied to premia to provide a measure of degree of correlation in asset returns. The chart titled Micro-Cap Equities Have Provided Strong Long-Term Returns illustrates the performance of a hypothetical \$1 investment in Large-Cap Stocks as measured by the S&P 500 and Micro-cap Equities as measured by Ibbotson & Associates. Assumes reinvestment of dividends and capital gains, but does not reflect the effect of any applicable sales charge or redemption fees. This chart does not imply any future performance.*

**Past performance does not guarantee future results. Index performance is not illustrative of fund performance. You cannot directly invest in an index. For fund performance, visit [www.perritmutualfunds.com](http://www.perritmutualfunds.com) or click here.**

**Mutual fund investing involves risk. Principal loss is possible. The Funds invest in smaller companies, which involve additional risks such as limited liquidity and greater volatility. The Funds invest in micro-cap companies which tend to perform poorly during times of economic stress. The Ultra MicroCap Opportunities Fund may invest in early stage companies which tend to be more volatile and somewhat more speculative than investments in more established companies.**

